UNITED STATES PATENT AND TRADEMARK OFFICE

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _(3)_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _11 October 2000_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-19_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-19_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _11 October 2000_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _5_.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

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Examiner's Detailed Office Action

1. This action is responsive to application **09/698,248**, filed **May 10, 2001**.

2. **Claims 1-19** have been examined.

Information Disclosure Statement

3. Examiner acknowledges applicants' submission of prior art and information disclosure. Nevertheless, applicant is respectfully remind of the ongoing Duty to disclose 37 C.F.R. 1.56 all pertinent information and material pertaining to the patentability of applicant's claimed invention, by continuing to submitting in a timely manner PTO-1449, Information Disclosure Statement (IDS) with the filing of applicant's of application or thereafter.

Drawings

4. The formal drawings have been reviewed by the United States Patent & Trademark Office of Draftperson's Patent Drawings Review.

Specification

5.   The specification has not been checked to the extent necessary to determine the presence

of all possible minor errors. Applicant's cooperation is required in correcting any errors of which

applicant may become aware in the specification. Appropriate correction is required.

Claim Interpretation

6.   Office personnel are to give claims their **"broadest reasonable interpretation"** in light

of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28

(Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not

read into the claim. *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551(CCPA

1969). See *also *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322(Fed. Cir. 1989)

("During patent examination the pending claims must be interpreted as broadly as their terms

reasonably allow. . . . The reason is simply that during patent prosecution when claims can be

amended, ambiguities should be recognized, scope and breadth of language explored, and clari-

fication imposed. . . . An essential purpose of patent examination is to fashion claims that are

precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be

removed, as much as possible, during the administrative process."). *see* MPEP § 2106

Claim Rejections - 35 USC § 102

7.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8.   **Claims 1-4, 8-12, & 16-17** are rejected under 35 U.S.C. 102(b)

as being as being anticipated by

Puckett (USPN 5,619,621), Filed: Jul. 15, 1994; Date of Patent: Apr. 8, 1997.

Regarding claim 1:

Puckett teaches,

A method for finding in a larger system, components or subsystems that meet a predefined

set of requirements, through the use of rule-based searches and block diagrams, the method

comprising:

selecting a first block from a block design of a system, where the block design comprises a

plurality of blocks, each block representing a component or subsystem of the block design;

[FIG. 1; (col. 3, line 64 to col. 4, line 10 *"The expert system of the present invention can be used*

in various contexts including the diagnosis and/or configuration of electronic or

electromechanical equipment. In particular, the present invention has been embodied in a system

for diagnosing malfunctions within an automated archival data storage system having robotic

capabilities where the data is stored on a plurality of cataloged cartridge magnetic tapes. Thus,

FIG. 1 represents a block diagram of the present invention used in the context of diagnosing

*such an automated archival data storage system 14. **Note that the double lined arrows of FIG. 1***

indicate data flows between blocks and the single lined arrows indicate control flows. Thus,

the double lined arrows denote the transfer of diagnostic data and/or expert system rules

related to diagnosing faults of the system 14, while the single lined arrows indicate the

direction of the flow of control and related control data.")]

submitting a search query to a database of objects for researching which component or

subsystem to use for the first block; **[FIG. 1; (col. 4, line 59 to col. 5, line 5** *"The sensors*

associated with the module/submodule component hierarchy of the data storage system 14

provide their output to an event log database 42. This database stores the data substantially

sequentially according to the time the data is received. The diagnostic data captured in the event

log database 42 is provided to a preprocessor 46 as a result of a preprocessor 46 query of the

event log database. The preprocessor 46 transforms the low level time dependent sensor output

data satisfying the query into high level facts which are substantially time independent. The

preprocessor 46, in turn, outputs the high level facts to a knowledge base 48 more precisely to a

fact base 50. The facts residing in the fact base 50 are supplied to the inference engine 10 of the

present invention.")]

receiving an answer set from the database of objects that satisfies the search query, where the

answer set comprises at least one object from the database of objects; **[FIG. 1; (col. 5, line 1-9**

"The preprocessor 46, in turn, outputs the high level facts to a knowledge base 48 more precisely

to a fact base 50. The facts residing in the fact base 50 are supplied to the inference engine 10 of

the present invention. The facts are used by the inference engine 10 for: (3.1) determining if the

premise of one or more expert system "premise-consequent" (i.e., if-then) rules relating to a data

storage system 14 malfunction diagnosis evaluates to true;")]

assigning at least one candidate object from the answer set to the first block in the block design;

[FIG. 1 & FIG. 2; (col. 5, line 10–15 " *(3.2) performing the action related to the consequent(s)*

for the rule(s) whose premise(s) evaluate to true in (3.1). Thus, in addition to the facts, the

inference engine 10 also receives <u>*rules*</u> *from the rule base 54 to be used in (3.1) and (3.2)*

above.") **& (col. 5, line 30-50** *"The rule base 54 is structured such that its* <u>*rules*</u> *are partitioned*

into "rule sets," each rule set having one or more <u>*rules*</u>. *Further, the rule sets are organized*

<u>*hierarchically*</u> *in a manner relating to the module/submodule functional decomposition hierarchy*

of the data storage system 14. Thus, diagnostic <u>*rules*</u> *related to the overall performance of the*

higher level modules are contained in the higher level rule sets and the lower level rule sets

contain <u>*rules*</u> *related to the performance of lower level submodules. More precisely, referring to*

FIG. 2, a hierarchy of rule sets is presented having four levels 0 through 3 with level 0 being the

highest. In the present embodiment, rule set A of FIG. 2 includes <u>*rules*</u> *for determining which (if*

any) of the highest level modules of the data storage system 14 have malfunctioned. The next

level of rule sets, i.e., level 1 rule sets, include <u>*rules*</u> *for diagnosing, at a high level, a*

malfunction detected in one of the high level modules of the data storage system 14. More

precisely, level 1 includes, for each of the modules: the controllers LMU.sub.-- 0, LMU.sub.-- 1,

and the library storage modules LSM.sub.-- 0 through LSM.sub.-- 15, a rule set B.sub.k for

diagnosing malfunctions of each module, respectively.")**]** and

repeating the steps of selecting, submitting, receiving, and assigning for at least one other block

in the block design. **[FIG. 4 (col. 3, line 46-50** *"is a block diagram of the inference engine 10 of*

the present invention.") **& FIG. 5;** (*"FIG. 5 is a flowchart of the steps performed by the depth*

search module 100 of the inference engine 10 of the present invention during the inferencing

process.")]

Regarding claim 2:

Puckett teaches,

The method for finding in a larger system, components or subsystems that meet a predefined set of requirements from claim 1 wherein the step of assigning is automatic if the answer set contains exactly one object. **[FIG. 1 & FIG. 2; (col. 5, line 10–15 "** *(3.2) performing the action related to the consequent(s) for the rule(s) whose premise(s) evaluate to true in (3.1). Thus, in addition to the facts, the inference engine 10 also receives rules from the rule base 54 to be used in (3.1) and (3.2) above.*") **& (col. 6, line 16-38** *"The rule sets presented in FIG. 3 will now be discussed in greater detail. Regarding rule set A, this rule set includes rules which test for the existence of an event log data base 42 event log file and if found subsequently searches for an indication of a degraded or inoperative component among the highest level functional components of the data storage system 14. Thus, assuming such an event log file exists, the consequent portion of each rule provides high level instructions for searching the event log file for facts relating to a predetermined malfunction. For example, the first rule of rule set A has a consequent which instructs the search strategies unit 58 to provide a search procedure for investigating whether the event log file contains data indicating that the LMU.sub.-- 0 is degraded; i.e., performing below an acceptable standard (e.g., too many data transfer retries). Similarly, the second rule of rule set A performs the same determination for the second controller 18, LMU.sub.-- 1. In brief, rule set A presently includes three categories of rules: (a) rules for determining if one of the controllers 18 is degraded (i.e., the first two rules); (b) rules for determining if one of the library storage modules, LSM, is degraded; and (c) rules for*

determining if any of the library storage modules includes an inoperative device.")]

Regarding claim 3:

Puckett teaches,

The method for finding in a larger system, components or subsystems that meet a predefined set

of requirements from claim 1, wherein the step of repeating is repeated for all remaining blocks

in the block design. **[(col. 6, line 39-46** *"Note that upon encountering any of these rules or*

similarly structured rules, it is a feature of the inference engine 10, subsequent to determining

the validity of a rule premise, to both perform the rule consequent and examine any status

returned by that consequent as will be detailed below with reference to FIGS. 5-7. For example,

the consequent of each of the rules in rule set A is capable of returning a success/failure status.")

& (col. 3, line 46-58 *"FIG. 4 is a block diagram of the inference engine 10 of the present*

invention. FIG. 5 is a flowchart of the steps performed by the depth search module 100 of the

inference engine 10 of the present invention during the inferencing process. FIG. 6 is a flowchart

of the steps performed by the breadth search module 104 of the inference engine 10 when

selecting a rule from a rule set to apply to the data currently residing in the fact base 50.

FIG. 7 is a flow chart of the steps performed by the pattern matching module 108 of the

inferencing engine 10 when determining whether the premise of a rule is satisfied by the facts

currently residing in the fact base 50.")]

Regarding claim 4:

Puckett teaches,

The method for finding in a larger system, components or subsystems that meet a

predefined set of requirements from claim 1, wherein the step of assigning comprises:

associating a candidate object from the answer set to the first block in the block design;

[FIG. 3 ; (col. 6, line 16-30 *"The rule sets presented in FIG. 3 will now be discussed in greater*

detail. Regarding rule set A, this rule set includes rules which test for the existence of an event

log data base 42 event log file and if found subsequently searches for an indication of a

degraded or inoperative component among the highest level functional components of the data

storage system 14. Thus, assuming such an event log file exists, the consequent portion of each

rule provides high level instructions for searching the event log file for facts relating to a

predetermined malfunction. For example, the first rule of rule set A has a consequent which

instructs the search strategies unit 58 to provide a search procedure for investigating whether

the event log file contains data indicating that the LMU.sub.-- 0 is degraded; i.e., performing

below an acceptable standard (e.g., too many data transfer retries).")] and

updating the block design by replacing the first block with a representation of the candidate

object. **[FIG. 3; (col. 6, line 31-38** *"Similarly, the second rule of rule set A performs the same*

determination for the second controller 18, LMU.sub.-- 1. In brief, rule set A presently includes

three categories of rules: (a) rules for determining if one of the controllers 18 is degraded (i.e.,

the first two rules); (b) rules for determining if one of the library storage modules, LSM, is

degraded; and (c) rules for determining if any of the library storage modules includes an

inoperative device.")]

Regarding claim 8:

Puckett teaches,

The method for finding in a larger system, components or subsystems that meet a predefined set

of requirements from claim 1, wherein the database of objects comprises software modules.

[(col. 1, line 49-59 *"Given the above observations and the high demand for such experts,*

artificially intelligent software systems known as expert systems have been developed to

automatically provide much of the expertise that formerly required a human expert. Such

systems typically include at least three components: a rule base having rules embodying the

knowledge an expert uses in solving a problem, a fact base having data related to the specific

problem at hand which is to be solved, and an inference engine which selects pertinent rules

from the rule base to apply to the problem given the current facts in the fact base.")]

Regarding claim 9:

Puckett teaches,

A method for finding in a larger system, components or subsystems that meet a predefined set of

requirements, through the use of rule-based searches and block diagrams comprising:

selecting a first generic description from a system design, where the system design comprises

a plurality of generic descriptions, each generic description representing a component or

subsystem of the system design; **(col. 5, line 65 to col. 6, line 38** *"Referring now to FIG. 3,*

examples are given of the rules in a number of rule sets represented in FIG. 2. It is important to

note that for each rule set, the rules within the rule set apply to the same functional component

or module within a hierarchical decomposition of the computational system being diagnosed.

Thus, in general, by determining the parameters to examine for a given functional component,

it has been determined that the premise of each rule within a given rule set may be structured

substantially the same by providing a template premise having, for each such parameter, a

parameter related predicate or condition within the template premise such that an

instantiation of the template premise in a given rule may provide predetermined values or

ranges of these parameters which must be satisfied for the rule premise to be satisfied. Thus,

regarding the rule sets of FIG. 3 for the data storage system 14, it should be appreciated that for

each rule set, the rule premises for rules within the rule set have substantially identical structure.

submitting a search query to a database of objects for researching which component or

subsystem to use for the first generic description; **[FIG. 1; (col. 4, line 59 to col. 5, line 5** *"The*

sensors associated with the module/submodule component hierarchy of the data storage system

14 provide their output to an event log <u>database</u> 42. This <u>database</u> stores the data substantially

sequentially according to the time the data is received. The diagnostic data captured in the event

log <u>database</u> 42 is provided to a preprocessor 46 as a result of a preprocessor 46 <u>query</u> of the

event log <u>database</u>. The preprocessor 46 transforms the low level time dependent sensor output

data satisfying the <u>query</u> into high level facts which are substantially time independent. The

preprocessor 46, in turn, outputs the high level facts to a knowledge base 48 more precisely to a

fact base 50. The facts residing in the fact base 50 are supplied to the inference engine 10 of the

present invention.")]

receiving an answer set from the database of objects that satisfies the search query, where the

answer set comprises at least one object from the database of objects; **[FIG. 1; (col. 5, line 1-9**

"The preprocessor 46, in turn, outputs the high level facts to a knowledge base 48 more precisely

to a fact base 50. The facts residing in the fact base 50 are supplied to the inference engine 10 of the present invention. The facts are used by the inference engine 10 for: (3.1) determining if the premise of one or more expert system "premise-consequent" (i.e., if-then) <u>rules</u> relating to a data storage system 14 malfunction diagnosis evaluates to true;")]

assigning at least one candidate object from the answer set to the first generic description in the system design; **[FIG. 1 & FIG. 2;** (" *(3.2) performing the action related to the consequent(s) for the rule(s) whose premise(s) evaluate to true in (3.1). Thus, in addition to the facts, the inference engine 10 also receives <u>rules</u> from the rule base 54 to be used in (3.1) and (3.2) above.")* **& (col. 5, line 30-50** "*The rule base 54 is structured such that its <u>rules</u> are partitioned into "rule sets," each rule set having one or more <u>rules</u>. Further, the rule sets are organized <u>hierarchically</u> in a manner relating to the module/submodule functional decomposition hierarchy of the data storage system 14. Thus, diagnostic <u>rules</u> related to the overall performance of the higher level modules are contained in the higher level rule sets and the lower level rule sets contain <u>rules</u> related to the performance of lower level submodules. More precisely, referring to FIG. 2, a hierarchy of rule sets is presented having four levels 0 through 3 with level 0 being the highest. In the present embodiment, rule set A of FIG. 2 includes <u>rules</u> for determining which (if any) of the highest level modules of the data storage system 14 have malfunctioned. The next level of rule sets, i.e., level 1 rule sets, include <u>rules</u> for diagnosing, at a high level, a malfunction detected in one of the high level modules of the data storage system 14. More precisely, level 1 includes, for each of the modules: the controllers LMU.sub.-- 0, LMU.sub.-- 1, and the library storage modules LSM.sub.-- 0 through LSM.sub.-- 15, a rule set B.sub.k for diagnosing malfunctions of each module, respectively.")]* and

repeating the steps of selecting, submitting, receiving, and assigning for at least one other

generic description in the system design. **[FIG. 4 (col. 3, line 46-50** *"is a block diagram of the*

inference engine 10 of the present invention."**) & FIG. 5;** (*"FIG. 5 is a flowchart of the steps*

performed by the depth search module 100 of the inference engine 10 of the present invention

during the inferencing process.")**]**

Regarding claim 10:

Puckett teaches,

The method for finding in a larger system, components or subsystems that meet a predefined set

of requirements from claim 9, wherein the step of assigning is automatic if the answer set

contains exactly one object. **[FIG. 1 & FIG. 2; (col. 5, line 10–15** " *(3.2) performing the action*

related to the consequent(s) for the rule(s) whose premise(s) evaluate to true in (3.1). Thus, in

addition to the facts, the inference engine 10 also receives rules *from the rule base 54 to be used*

in (3.1) and (3.2) above."**) & (col. 6, line 16-38** *"The rule sets presented in FIG. 3 will now be*

discussed in greater detail. Regarding rule set A, this rule set includes rules which test for the

existence of an event log data base 42 event log file and if found subsequently searches for an

indication of a degraded or inoperative component among the highest level functional

components of the data storage system 14. Thus, assuming such an event log file exists, the

consequent portion of each rule provides high level instructions for searching the event log file

for facts relating to a predetermined malfunction. For example, the first rule of rule set A has a

consequent which instructs the search strategies unit 58 to provide a search procedure for

investigating whether the event log file contains data indicating that the LMU.sub.-- 0 is

degraded; i.e., performing below an acceptable standard (e.g., too many data transfer retries).

Similarly, the second rule of rule set A performs the same determination for the second

controller 18, LMU.sub.-- 1. In brief, rule set A presently includes three categories of rules: (a)

rules for determining if one of the controllers 18 is degraded (i.e., the first two rules); (b) rules

for determining if one of the library storage modules, LSM, is degraded; and (c) rules for

determining if any of the library storage modules includes an inoperative device.")]

Regarding claim 11:

Puckett teaches,

The method for finding in a larger system, components or subsystems that meet a predefined set

of requirements from claim 9, wherein the step of repeating is repeated for all remaining blocks

in the block design. [(col. 6, line 39-46 *"Note that upon encountering any of these rules or*

similarly structured rules, it is a feature of the inference engine 10, subsequent to determining

the validity of a rule premise, to both perform the rule consequent and examine any status

returned by that consequent as will be detailed below with reference to FIGS. 5-7. For example,

the consequent of each of the rules in rule set A is capable of returning a success/failure status.")

& (col. 3, line 46-58 *"FIG. 4 is a block diagram of the inference engine 10 of the present*

invention. FIG. 5 is a flowchart of the steps performed by the depth search module 100 of the

inference engine 10 of the present invention during the inferencing process. FIG. 6 is a flowchart

of the steps performed by the breadth search module 104 of the inference engine 10 when

selecting a rule from a rule set to apply to the data currently residing in the fact base 50.

FIG. 7 is a flow chart of the steps performed by the pattern matching module 108 of the

inferencing engine 10 when determining whether the premise of a rule is satisfied by the facts

currently residing in the fact base 50.")]

Regarding claim 12:

Puckett teaches,

The method for finding in a larger system, components or subsystems that meet a predefined set

of requirements from claim 9, wherein the step of assigning comprises:

associating a candidate object from the answer set to the first block in the block design; **[FIG. 3;**

(col. 6, line 16-30 *"The rule sets presented in FIG. 3 will now be discussed in greater detail.*

Regarding rule set A, this rule set includes rules which test for the existence of an event log data

base 42 event log file and if found subsequently searches for an indication of a degraded or

inoperative component among the highest level functional components of the data storage system

14. Thus, assuming such an event log file exists, the consequent portion of each rule provides

high level instructions for searching the event log file for facts relating to a predetermined

malfunction. For example, the first rule of rule set A has a consequent which instructs the search

strategies unit 58 to provide a search procedure for investigating whether the event log file

contains data indicating that the LMU.sub.-- 0 is degraded; i.e., performing below an acceptable

standard (e.g., too many data transfer retries).")] and

updating the block design by replacing the first block with a representation of the candidate

object. **[FIG. 3; (col. 6, line 31-38** *"Similarly, the second rule of rule set A performs the same*

determination for the second controller 18, LMU.sub.-- 1. In brief, rule set A presently includes

three categories of rules: (a) rules for determining if one of the controllers 18 is degraded (i.e.,

the first two rules); (b) rules for determining if one of the library storage modules, LSM, is

degraded; and (c) rules for determining if any of the library storage modules includes an

inoperative device.")]

Regarding claim 16:

Puckett teaches,

The method for finding in a larger system, components or subsystems that meet a predefined set

of requirements from claim 9, wherein the database of objects comprises software modules.

[(col. 1, line 49-59 *"Given the above observations and the high demand for such experts,*

artificially intelligent software systems known as expert systems have been developed to

***automatically provide much of the expertise that formerly required a human expert.** Such*

systems typically include at least three components: a rule base having rules embodying the

knowledge an expert uses in solving a problem, a fact base having data related to the specific

problem at hand which is to be solved, and an inference engine which selects pertinent rules

from the rule base to apply to the problem given the current facts in the fact base.")]

Regarding claim 17:

Puckett teaches,

A rule-based refinement tool, for finding in a larger system, components or subsystems

that meet a predefined set of requirements, through the use of rule-based searches and block

diagrams, comprising:

a database of objects, wherein the objects are related to components or subsystems; **[FIG. 1;**

(col. 4, line 59 to col. 5, line 5 *"The sensors associated with the module/submodule component*

hierarchy of the data storage system 14 provide their output to an event log database 42. This

database stores the data substantially sequentially according to the time the data is received.

The diagnostic data captured in the event log database 42 is provided to a preprocessor 46 as a

result of a preprocessor 46 query of the event log database. The preprocessor 46 transforms the

low level time dependent sensor output data satisfying the query into high level facts which are

substantially time independent. The preprocessor 46, in turn, outputs the high level facts to a

knowledge base 48 more precisely to a fact base 50. The facts residing in the fact base 50 are

supplied to the inference engine 10 of the present invention.")]

a search engine which accepts a search query and executes the search query against the database

of objects to determine which components or subsystems can be used for a generic description

portion of a system design, which returns an answer set of at least one candidate object; **[FIG. 3;**

(col. 5, line 16-29 *"When further facts are required by the inference engine 10, the search*

strategies unit 58 is invoked to translate a high level search query so that the event log database

42 may be properly searched via the preprocessor 46. Alternatively, when it is determined that

no further detailed diagnosis can be obtained, the inference engine 10 outputs the current state

of a diagnosis to the diagnosis output unit 62 (e.g. a file or report generator). Thus, the inference

engine 10 receives high level facts from the fact base 50 and after examining a pertinent set of

rules either terminates the diagnosis process and provides the current state of the diagnosis to

the output unit 62, or determines that further more detailed data should be requested from the

event log database 42 via the search strategies unit 58 and the preprocessor 46.") **& (col. 5,**

line 65 to col. 6, line 38 *"Referring now to FIG. 3, examples are given of the rules in a number*

of rule sets represented in FIG. 2. It is important to note that for each rule set, the rules within

the rule set apply to the same functional component or module within a hierarchical

decomposition of the computational system being diagnosed. **Thus, in general, by determining**

the parameters to examine for a given functional component, it has been determined that the

premise of each rule within a given rule set may be structured substantially the same by

providing a template premise having, for each such parameter, a parameter related predicate

or condition within the template premise such that an instantiation of the template premise in

a given rule may provide predetermined values or ranges of these parameters which must be

satisfied for the rule premise to be satisfied. *Thus, regarding the rule sets of FIG. 3 for the data*

storage system 14, it should be appreciated that for each rule set, the rule premises for rules

within the rule set have substantially identical structure. The rule sets presented in FIG. 3 will

now be discussed in greater detail. Regarding rule set A, this rule set includes rules which test

for the existence of an event log data base 42 event log file and if found subsequently searches

for an indication of a degraded or inoperative component among the highest level functional

components of the data storage system 14. Thus, assuming such an event log file exists, the

consequent portion of each rule provides high level instructions for searching the event log file

for facts relating to a predetermined malfunction. For example, the first rule of rule set A has a

consequent which instructs the search strategies unit 58 to provide a search procedure for

investigating whether the event log file contains data indicating that the LMU.sub.-- 0 is

degraded; i.e., performing below an acceptable standard (e.g., too many data transfer retries).

Similarly, the second rule of rule set A performs the same determination for the second

controller 18, LMU.sub.-- 1. In brief, rule set A presently includes three categories of rules: (a)

rules for determining if one of the controllers 18 is degraded (i.e., the first two rules); (b) rules

for determining if one of the library storage modules, LSM, is degraded; and (c) rules for

determining if any of the library storage modules includes an inoperative device.")] and

an assignment processor for assigning at least one candidate object from the answer set to the

generic description in the system design. **[FIG. 1; (col. 4, line 59 to col. 5, line 5** *"The sensors*

associated with the module/submodule component hierarchy of the data storage system 14

provide their output to an event log <u>database</u> 42. This <u>database</u> stores the data substantially

sequentially according to the time the data is received. The diagnostic data captured in the event

log <u>database</u> 42 is provided to a preprocessor 46 as a result of a preprocessor 46 <u>query</u> of the

event log <u>database</u>. The preprocessor 46 transforms the low level time dependent sensor output

data satisfying the <u>query</u> into high level facts which are substantially time independent. The

preprocessor 46, in turn, outputs the high level facts to a knowledge base 48 more precisely to a

fact base 50. The facts residing in the fact base 50 are supplied to the inference engine 10 of the

present invention.")]

Claim Rejections - 35 USC § 103

9.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section
> 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the
> subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill
> in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the
> invention was made.

10.   **Claims 5-7, 13-15, & 18-19** are rejected under 35 U.S.C. 103(a) as being unpatentable

over

Puckett (USPN 5,619,621), Filed: Jul. 15, 1994; Date of Patent: Apr. 8, 1997,

in view of

Sebastian et al. (USPN 5,822,206), Filed: Aug, 30, 1996; Date of Patent: Oct. 13, 1998,

in further view of

Toong et al. (USPN 6,604,114 B1), Filed: Aug. 24, 2000; Date of Patent: Aug. 5, 2003.

The *Puckett* has been discussed above and does not explicitly teach the limitations of

claims 5 & 13. However *Sebastian et al.* teaches the limitations of claims 5 & 13.

Regarding claim 5 & 13:

Sebastian et al. teaches,

The method for finding in a larger system, components or subsystems that meet a

predefined set of requirements from claim 1, wherein the database of objects comprises

engineering designs and engineering components. **[(Abstract** *"A computer-based engineering*

design system to design a part, a tool to make the part, and the process to make the part. The

design system has a processor and a memory. The memory stores feature templates, each feature

template being a representation of a primitive object having a form and a function. Each feature

template is indexed by the function of the primitive object and includes a representation of a

primitive geometric entity having the form of the primitive object. Each feature template can

include information relating to a tool to make the primitive object and a process to make the

primitive object. The design system also includes an input device for receiving a request to

design the part. This request includes one or more predetermined functions that the part

performs. A core design module, executable by the processor, designs the part, the tool to make

the part and process to make the part by accessing the plurality of feature templates in the

memory to locate one or more primitive objects that perform the one or more predetermined

functions.") **&** *("FIG. 3 is a flow chart describing the steps of the methodology of the present*

invention. FIG. 4 is a block diagram of the modules of the present invention.")] It would have

been obvious at the time the invention was made to a person having ordinary skill in the art to

which said subject matters pertains, to combine *Puckett* with *Sebastian et al.* because this field

itself is now maturing and the emphasis is moving towards the highest levels of the design

process in the system requirements specification i.e., the field of Engineering Knowledge

Management. Moreover, we can now see the potential for realizing a seamless linkage of

computer-based techniques and tools from a market-oriented statement of need, right through to

detail design for manufacture. Additionally, the application of rule-based techniques for design

synthesis can be extended well beyond the mechatronic domain which was and remains a central

theme. Finally, applications in architectural and building design, heating and ventilating and air-

conditioning systems (HVAC) and energy distribution and control are attracting attention.

The *Puckett* has been discussed above and does not explicitly teach the limitations of

claims 6-7 & 14-15. However *Toong et al.* teaches the limitations of claims 6-7 & 14-15.

Regarding claim 6 & 14:

Toong et al. teaches,

The method for finding in a larger system, components or subsystems that meet a predefined set

of requirements from claim 1, wherein the database of objects comprises technical papers.

[(col. 8, line 27-44 *"As the Webs are rich in visual information with distinct patterns, clusters,*

and anomalous data, they provide graphical depictions of data sets and the relationships

between data sets that may be employed to infer trends readily. Some examples of information

contained within Webs are given below: In the patent plane, a Web pattern of converging

citation connections may imply a key blocking patent, a seminal patent, or a rich source of

potential licensing revenue; Patents which have no forward references might imply a unique IP

opportunity or conversely, no commercial viability; Many patents from a single organization

that are concentrated in an area of a Web will lead to a thorough claims analysis of the

connected group to determine if blocking positions are being taken by that organization; this,

could be correlated with Webs to technical papers *and business deals relevant to this position.*

These are but a few examples of trends that can be inferred from the data represented in

Webs.")] It would have been obvious at the time the invention was made to a person having

ordinary skill in the art to which said subject matters pertains, to combine the references because

engineering has a long tradition of establishing standards and codification of useful knowledge

and practices. Moreover, a vast array of journals, technical papers, manuals, manuscripts, public

patents, and guides on topics ranging from project implementation, safety practices, operating

policies, training records, and plant maintenance etc. have been developed over the years.

Regarding claim 7 & 15:

Toong et al. teaches,

The method for finding in a larger system, components or subsystems that meet a predefined set

of requirements from claim 1, wherein the database of objects comprises patent documents.

[(col. 6, line 60 to col. 7, line 22 *"In the case of a search over a targeted database 28 that*

comprises a patent database, these searches may result in several hundred or a few thousand

patents that may have direct or indirect impact upon the case being studied. For example, a

particular company may have 50 patents on DRAM memory and be concerned about (1) its

competitors patent portfolios (could be several hundred); (2) its competitive position vis-a-vis

those portfolios (relationships between the portfolios); or (3) how does it continue to position its

new patents within the field. Standard keyword approaches would involve linear iterative

searches focused around keyword strings; sets of documents containing these keywords will be

selected for further study as the search process continues. The system 10, in one practice may

first use the Keyword Grid approach that forms compound and complex keyword combinations

and then automatically searches the databases 28. Secondly, the system 10 may use information

within documents to interactively refine, and in some cases expand, searches. For example, in

the patent example above, the Keyword Grid 40 will yield a matrix of document hits that satisfy

various combinations of keyword strings 44. The system 10 can then find related documents that

are connected to the matrix of documents by various fields or contexts specified by the operator

(e.g. sister or offspring <u>patent documents</u>). In the end, the output of the data retrieval element 18

is a high quality working set, WS. Optionally, the system 10 may automatically allow the

selection and creation of working sets resulting from `new` documents that are found through

successive searches. The creation of working sets may also apply for unreviewed documents.")]

It would have been obvious at the time the invention was made to a person having ordinary skill

in the art to which said subject matters pertains, to combine the references because engineering

has a long tradition of establishing standards and codification of useful knowledge and practices.

Moreover, a vast array of journals, technical papers, manuals, manuscripts, public patents, and

guides on topics ranging from project implementation, safety practices, operating policies,

training records, and plant maintenance etc. have been developed over the years.

The *Puckett* has been discussed above and does not explicitly teach the limitations of

claims 18-19. However *Toong et al.* teaches the limitations of claims 18-19.

Regarding claim 18:

Toong et al. teaches,

The rule-based refinement tool from claim 17, further comprising a drawing module which

graphically presents the generic descriptions of the system design as a series of blocks

interconnected to form a block diagram. **[(col. 5, line 1-27** *"The data processing system 12*

depicted in FIG. 10 can be any conventional data processing system such as an IBM PC

compatible computer running the Windows.RTM. operating system, or a sub work station

running a Unix operating system. The user monitor applicable device 14 can be a conventional

computer monitor and keyboard. In the embodiment depicted by FIG. 10, the user port terminal

14 and the data processor 12 provide the user with a conventional data processing platform that

can be employed for searching through a plurality of databases to identify a set of data elements

each of which is possibly relevant through to an interest, query, or question of the user.

Accordingly, the system 10 can operate as a work station that has been programmed, or

include an application program, that allows the user to search through polarity of databases to

collect information relevant to a user query. From the information collected in response to the

user query, the system 10 can organize an analysis the data elements to provide to the user a

graphical depiction on the different data elements collected in certain ones of the relationship

between those data elements. This is depicted in FIG. 10 by the graphical depiction of data

elements 30. Accordingly, it will be understood that the system 10 allows a user to receive a

graphical depiction of the returned data set, and thereby allows the user or easily to do some

models of current behavior, and other inferences, and thereby provides the user with improved

opportunities for data analysis.")] It would have been obvious at the time the invention was

made to a person having ordinary skill in the art to which said subject matters pertains, to

combine the references because drawing modules, providing block diagrams are old and

well known.

Regarding claim 19:

Toong et al. teaches,

The rule-based refinement tool from claim 18, further wherein the assignment processor

instructs the drawing module to graphically replace the generic description with the candidate

object. [(col. 5, line 1-27 *"The data processing system 12 depicted in FIG. 10 can be any conventional data processing system such as an IBM PC compatible computer running the Windows.RTM. operating system, or a sub work station running a Unix operating system. The user monitor applicable device 14 can be a conventional computer monitor and keyboard. **In the embodiment depicted by FIG. 10, the user port terminal 14 and the data processor 12 provide the user with a conventional data processing platform that can be employed for searching through a plurality of databases to identify a set of data elements each of which is possibly relevant through to an interest, query, or question of the user**. Accordingly, the system 10 can operate as a work station that has been programmed, or include an application program, that allows the user to search through polarity of databases to collect information relevant to a user query. From the information collected in response to the user query, the system 10 can organize an analysis the data elements to provide to the user a graphical depiction on the different data elements collected in certain ones of the relationship between those data elements. This is depicted in FIG. 10 by the graphical depiction of data elements 30. Accordingly, it will be understood that the system 10 allows a user to receive a graphical depiction of the returned data set, and thereby allows the user or easily to do some models of current behavior, and other inferences, and thereby provides the user with improved opportunities for data analysis."*)] It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matters pertains, to combine the references because drawing modules, providing block diagrams are old and well known. Moreover, data files with input data provide the makeup of carrying out analysis of the reliability and availability of data relevant for the computer-based system.

Conclusion

9.   The prior art made of record and (listed of form **PTO-892**) not relied upon is considered

pertinent to applicant's disclosure as follows. Applicant or applicant's representative is respect-

fully reminded that in process of patent prosecution i.e., amending of claims in response to a

rejection of claims set forth by the Examiner per Title 35 U.S.C. The patentable novelty must be

clearly shown in view of the state of the art disclosed by the references cited and any objections

made. Moreover, applicant or applicant's representative must clearly show how the amendments

avoid or overcome such references and objections. *See* **37 CFR § 1.111(c)**.
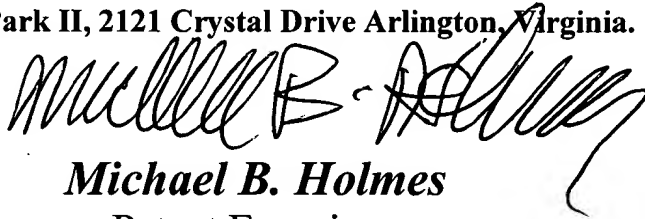
Correspondence Information

10.   Any inquiries concerning this communication or earlier communications from the

examiner should be directed to **Michael B. Holmes** who may be reached via telephone at

(703) 308-6280. The examiner can normally be reached Monday through Friday between

8:00 a.m. and 5:00 p.m. eastern standard time.

If you need to send the Examiner, a facsimile transmission regarding After Final

issues, please send it to **(703) 746-7238**. If you need to send an Official facsimile trans-

mission, please send it to **(703) 746-7239**. If you would like to send a Non-Official (draft)

facsimile transmission the fax is **(703) 746-7240**. If attempts to reach the examiner by tele-

phone are unsuccessful, the **Examiner's Supervisor, Anthony Knight**, may be reached at

(703) 308-3179.

Any response to this office action should be mailed too:

Director of Patents and Trademarks Washington, D.C. 20231. Hand-delivered

responses should be delivered to the Receptionist, located on the fourth floor of

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